



University Council

February 6, 2026

UNIVERSITY CURRICULUM COMMITTEE – 2025-2026

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Dear Colleagues:

The attached proposal from the Odum School of Ecology and the College of Engineering to offer an Undergraduate Certificate in Ecological Restoration and Nature-Based Engineering will be an agenda item for the February 13, 2026, Full University Curriculum Committee meeting.

Sincerely,

Susan Sanchez, Chair

cc: Provost Benjamin Ayers

Dr. Marisa Anne Pagnattaro

PROPOSAL FOR A CERTIFICATE PROGRAM

Date: January 22, 2026

School/College/Unit: Odum School of Ecology
College of Engineering

Department/Division: Odum School of Ecology
College of Engineering

Certificate Title: Undergraduate Certificate in Ecological Restoration and Nature-Based Engineering

CIP: 26130500

Effective Term: Fall 2026

Which campus(es) will offer this certificate? Athens

Level (Undergraduate, Graduate, or Post-Baccalaureate): Undergraduate

Program Abstract:

The proposed Undergraduate Certificate in Ecological Restoration and Nature-Based Engineering (ERNE) is designed to help students from a wide variety of academic units and majors strategically align their course of study with the interdisciplinary knowledge and skill requirements of emerging job markets in nature-based solutions (NbS), ecological restoration, and engineering with nature. The certificate will offer training in key skills and foundational knowledge necessary for ecological restoration and natural infrastructure projects, and a fundamental understanding of the different disciplines and practices in that field. Interest and investment in NbS, natural infrastructure, and ecological restoration are rising worldwide, in parallel with a boom in infrastructure development and related job opportunities. This certificate program, which has been jointly developed by the Odum School of Ecology and the College of Engineering, leverages existing courses from several units at UGA and numerous faculty experts that make the Athens campus a growing epicenter for innovation in restoration and NbS innovation. Two new courses have been developed for the certificate, creating additional options for capstone experiences and major elective credit for a variety of majors. Certificate students must complete 15-18 credit hours, including three required courses and 2-3 electives, obtaining a grade of “C” (2.0) or higher in all courses taken for the certificate to complete certificate requirements. The certificate provides a structured approach to connect existing relevant coursework across campus to provide conceptual integration not currently available to students interested in this emerging career path.

1. Purpose and Educational Objectives

State the purpose and educational objectives of the program. How does this program complement the mission of the institution?

The purpose of the proposed Undergraduate Certificate in Ecological Restoration and Nature-Based Engineering is to provide students with a structured interdisciplinary education in disciplines relating to research and practice in the inter-related fields of ecological restoration, nature-based solutions, natural infrastructure, and engineering with nature. The program will teach students to apply training and concepts from their major discipline to employable skills for this emerging professional and academic field. The design and learning outcomes of the certificate have been developed directly to address this mission.

2. Need for the Program

Explain why this program is necessary. In addition, provide the following information:

- a. Semester/Year of Program Initiation:** Fall 2026
- b. Semester/Year of Full Implementation of Program:** Fall 2026
- c. Semester/Year First Certificates will be awarded:** Spring 2027
- d. Annual Number of Graduates expected (once the program is established):** 10-20
- e. Projected Future Trends for number of students enrolled in the program:**

It is expected that approximately 30-40 students will be enrolled in the certificate at any time once it is established.

Background and Motivation

The science and practice of restoring, engineering, and creating artificial ecosystems is gaining worldwide attention as an approach to addressing many major challenges of the 21st century. Restored and engineered ecosystems protect vulnerable cities and defense installations from flooding (Huang et al., 2020; Ferreira et al., 2021; Chambers et al, 2023), safeguard communities and crops against droughts (Sintayehu et al., 2023; Eslamian et al., 2025), buffer cities from extreme heat under increased urbanization, and increase the resilience of built landscapes and infrastructure to extreme weather events (Chausson et al., 2020). In addition, the power of nature to improve human mental and physiological health is increasingly well-understood, creating increased demand for created or semi-natural spaces, especially in urban areas (Barton and Rogerson, 2018; Gianfredi et al., 2021). The deliberate design and restoration of ecosystems is central to the newest emerging paradigm of biodiversity conservation, wherein practitioners seek to undo legacies of ecological damage and rebuild ecosystems to protect nature itself. The United Nations' "Decade of Ecosystem Restoration" (Jepson, 2022), ongoing until 2030, underscores the degree of international enthusiasm for the value of restoring and engineering nature for humanity. In the U.S., engineered ecosystems are a growing part of many states' climate adaptation plans, and the U.S. Army Corps of Engineers leverages natural infrastructure to solve major flood resilience problems throughout the country. Under the collective umbrella of "Nature-based Solutions" (NbS), interest in and funding for approaches like these are a rising tide presenting great opportunities for the state of Georgia.

Georgia's burgeoning economy, rapidly growing urban areas, and diverse natural resources make it an excellent laboratory for innovation and entrepreneurship in this field. Additionally, restoration and NbS projects in Georgia can make a real difference on the ground, helping to keep vulnerable communities safe from cycles of increasing extreme weather and supporting sustainable economic development throughout the state. Furthermore, NbS and ecological restoration practices represent an increasing part of reducing environmental risks to business and human well-being, maintaining Georgia's economic development while keeping its landscapes livable as new industries increase their presence and footprint in the state. Researchers from diverse academic units at the University of Georgia (UGA) are experts in numerous aspects of NbS and ecological restoration, making UGA a powerhouse in the field with major potential for taking a position of national and global leadership.

Realizing the potential of NbS and related practices for extreme weather mitigation, urban adaptation, and sustainable economic growth will require a new generation of professionals that are both experts in their respective fields but also conversant in other disciplines. A lack of necessary disciplinary expertise and yawning disciplinary siloes have been repeatedly identified in the literature as some of the biggest barriers to the widespread implementation (or "mainstreaming") of NbS. In order to address these gaps and meet the growing demand for capable NbS experts and professionals, programs are needed to help students learn complementary skillsets and gain exposure to the way that other disciplines approach, analyze, understand, and solve problems.

The International Labour Organization (ILO), International Union for Conservation of Nature (IUCN), and UN Environment Programme (UNEP) released a report showing that investing in nature-based solutions could create up to 32 million new jobs by 2030 (ILO and IUCN, 2024). This represents a significant increase from earlier projections. Investments in infrastructure, which many argue must include natural infrastructure, will be growing dramatically between now and 2050 (BCG, 2025). In the U.S., the passage of the Infrastructure Investment and Jobs Act in 2021 set the country on a long-term trajectory for infrastructure development, with hundreds of billions still slated for investment in coming years.

The rising demand for and interest in restoration and NbS require an unprecedented synthesis of academic knowledge and professional skills across diverse fields, including ecology, engineering, landscape architecture, economics, wildlife sciences, and agriculture, among others. Although UGA's faculty, curricula, and institutions have strengths across this range of knowledge, formalized opportunities for undergraduate students to take advantage of this expertise and leverage it toward an emerging job market remain limited. The proposed certificate addresses that gap by providing formal structure to students' courses of study and a foundations course in which they become familiarized with the approaches and ways of thinking of other disciplines, both through classwork and collaboration with their classmates from other academic units. Depending on their major, graduates of the program will be equipped to pursue entry-level jobs in fields like ecological restoration and consulting, landscape design, environmental engineering, restoration ecology and nature-based solutions. The interdisciplinary literacy and background provided by the certificate is meant to build upon knowledge from a student's home discipline to make them more competitive for jobs and graduate work in this emerging field.

3. Student Demand

a. Provide documentation of evidence of student demand for this program, including a student survey.

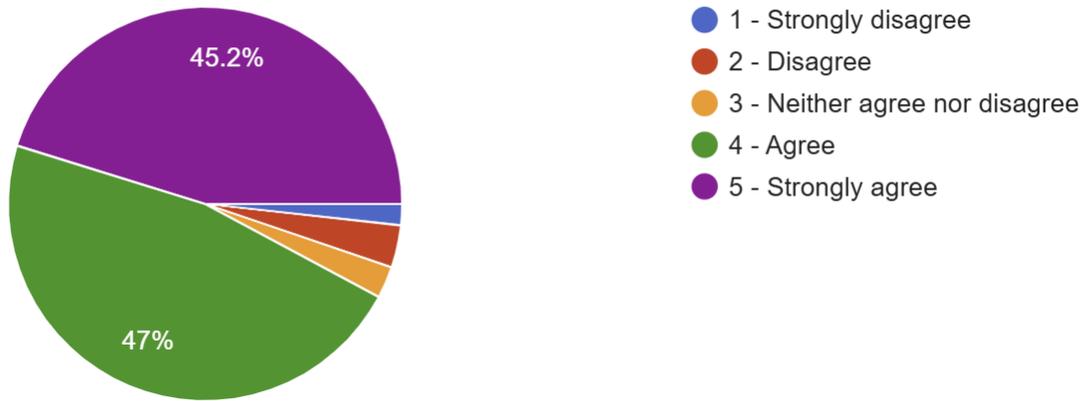
Undergraduate advisors and professors in the Odum School of Ecology, the College of Environment and Design, the Warnell School of Forestry and Natural Resources, and the Department of Marine Sciences in the Franklin College of Arts and Sciences were contacted to administer a short survey gauging student interest in a potential ERNE certificate.

Students were presented with a series of statements about the potential program and asked to rate their agreement across a scale (e.g., Strongly disagree, disagree, etc.). Of the 115 respondents, 97 also provided information on their home unit.

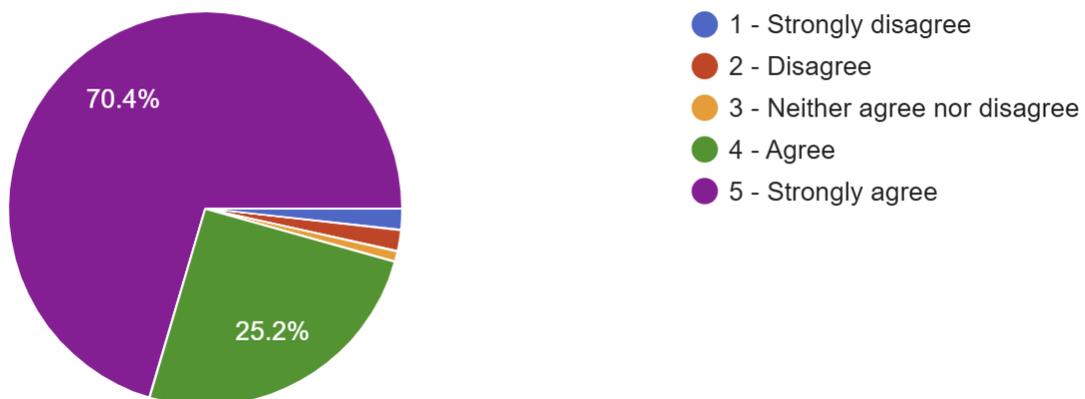
Question 1 – What is your major academic unit?



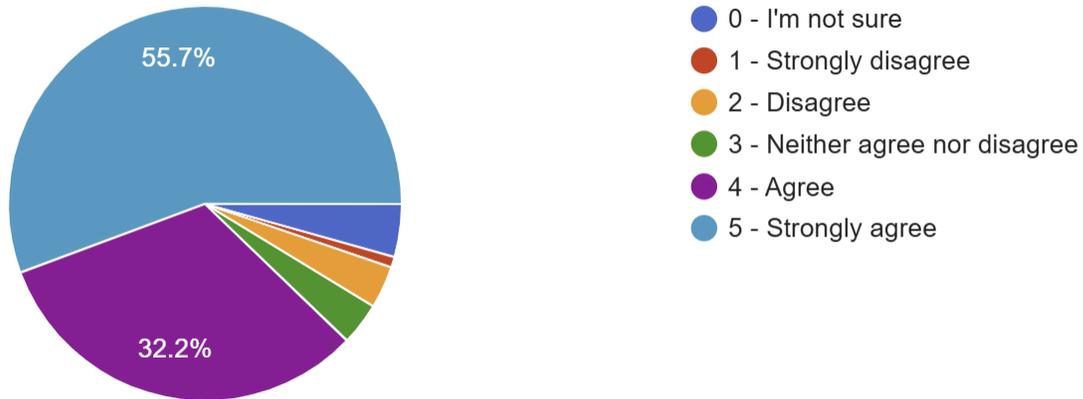
Statement 1 - Before this survey, I had heard of, or I was familiar with any of the following concepts: Restoration Ecology, Ecological Engineering, Nature-based Solutions, Ecological Restoration.



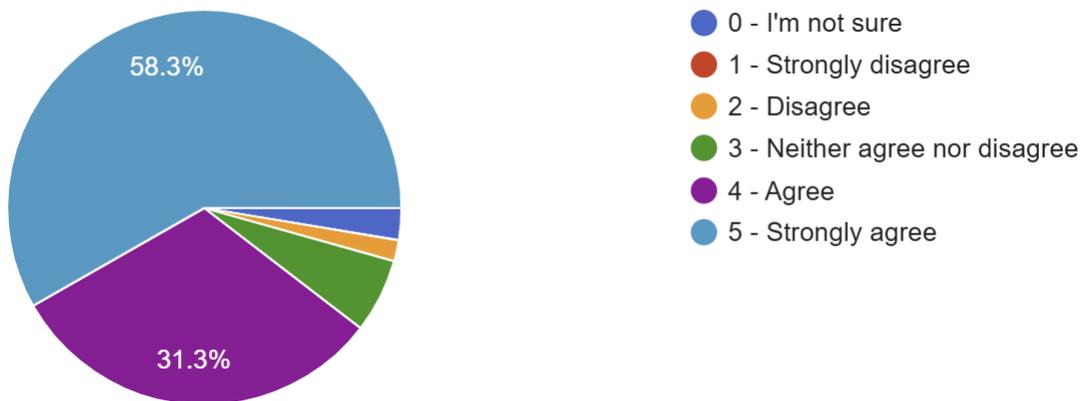
Statement 2 - I think that topics like Ecological Restoration, Ecological Engineering, Natural Infrastructure, and Nature-based Solutions could be relevant to my potential career interests.



Statement 3 - If such a certificate was available when I had started college, I would have considered completing a certificate in Restoration Ecology, Ecological Engineering, Nature-based Solutions, or Ecological Restoration, as part of my degree.



Statement 4 - I think this type of certificate could provide skills that make me more hireable for jobs I want.



b. Provide evidence that demand will be sufficient to sustain reasonable enrollment.

These survey results indicate that students from a variety of academic units are not only familiar with NbS concepts but believe that training organized around restoration ecology and NbS would make them more hireable. This is in line with the perspective put forward by many other restoration ecology certificate programs in the U.S., which emphasize the growing availability of jobs in this field for students from many different majors. More than 95% of respondents indicated that NbS were relevant to their career interests (Statement 2), and 89%

of respondents felt that the certificate would make them more hireable for the jobs that they want.

4. Program of Study

Provide a detailed program of study.

Students will be required to complete at least 15 hours of coursework toward the certificate, including three required courses, consisting of (1) a 2000-level existing engineering course with key relevance to the program, (2) a 3000-level foundations course developed specifically for the certificate, and (3) a 4000-level capstone course, for which a capstone developed specifically for certificate students will be available as an option.

The 3000-level foundations course created for the certificate will be ECOL(ENVE) 3330, Foundations of Ecological Restoration and Nature-Based Engineering. This course will provide students with an overview of the practices, component disciplines, and lexicons of ecological restoration, natural infrastructure, and nature-based solutions. Students will learn the concepts, theories, and applications of ecological engineering and restoration while gaining practical skills for being part of a project delivery team to carry out projects in the real world.

The 4000-level capstone course created for the certificate will be a service-learning course designed to convene students from various majors into project delivery teams to research, plan, design, and evaluate natural infrastructure and ecological restoration projects for real-world end-users. The course will combine lecture-style classes with guidance on project management and the roles of different types of expertise in a project development pipeline, with collaborative work periods and community stakeholder or client consultations. Alternative capstones taken instead of this course must have a service-learning component. Stakeholders and end-users for this course will be identified and selected by the instructor and/or program co-directors prior to each Spring semester.

a. Specific course prefixes, numbers, and titles

Required Courses (9-11 hours)

ECOL(ENVE) 3330, Foundations of Ecological Restoration and Nature-Based Engineering (3 hours, *Prerequisite: ENVE 2610 or ENGR 2110*) - **NEW**

Choose one of the following service-learning capstone courses:

ECOL 4720S, Capstone Project in Ecological Restoration and Nature-Based Solutions (3 hours, *Prerequisite: ECOL(ENVE) 3330*) - **NEW**

AENG 4910S, Capstone Design I (2 hours) **AND** AENG 4911S, Capstone Design II (2 hours)

CVLE 4910S, Capstone Design I (2 hours) **AND** CVLE 4911S, Capstone Design II (2 hours)

ENVE 4910S, Capstone Design I (2 hours) **AND** ENVE 4911S, Capstone Design 2 (2 hours)

Students should choose one of the following tracks based on their major.

Non-engineering majors

ENVE 2610, Introduction to Environmental Engineering and Sustainability (3 hours,
Prerequisite: MATH 1113)

Agricultural Engineering (B.S.A.E.) majors

Choose one of the following:

ECOL 1000, Ecological Basis of Environmental Issues (3 hours)

ECOL 3500, Ecology (3 hours)

Civil Engineering (B.S.C.E.) majors

ECOL 1000, Ecological Basis of Environmental Issues (3 hours)

OR choose any course listed below for Environmental Engineering (B.S.Env.E.) majors.

Environmental Engineering (B.S.Env.E.) majors

Choose one of the following courses:

ECOL 3300, Field Program in Ecological Problem-Solving (4 hours)

ECOL 3530, Conservation Biology (3 hours)

ECOL 3770S, Urban Ecology – Service Learning (3 hours)

ECOL 3885S, Ecology of Invasive Species (3 hours)

ECOL 4010/6010, Ecosystem Ecology (3 hours)

ECOL 4080/6080, Principles of Integrative Conservation and Sustainability (4 hours)

ECOL(FANR) 4220/6220, Restoration Ecology (3 hours)

ECOL(MARS) 4225-4225L, Methods in Marine Ecology (4 hours)

ECOL(FISH)(WASR) 4310/6310, Freshwater Ecosystems (3 hours)

MARS 4010, Marine Ecology (3 hours)

WILD(ECOL) 3580, Vertebrate Natural History (3 hours)

WILD 4100-4100L, Principles of Wildlife Habitat and Management (3 hours)

Elective Courses (6-8 hours)

Choose 6-8 hours from the following, with courses chosen from at least two different categories.

Social Dimensions

ANTH 3090, Past Peoples, Present Climates (3 hours)

ANTH 4070/6070, Cultural Ecology (3 hours)

ANTH 4085/6085, Conservation on a Changing Planet (3 hours)

ANTH(ECOL)(FANR)(SOCL) 4846, Environmental Governance (3 hours)

EHSC 3060, Foundations in Environmental Health (3 hours)

FANR 4020/6020, Sustainable Development (3 hours)

GEOG 3633, Cities and Nature (3 hours)
GEOG 4810/6810, Political Ecology and Environmental Governance (3 hours)
MARS 4400/6400, Introduction to Marine Policy (3 hours)

Biodiversity Dimensions

CRSS(HORT) 4400/6400, Agro-Ecology (3 hours)
CRSS(MIBO) 4610/6610-4610/6610L, Soil Microbiology (4 hours)
ECOL 4010/6010, Ecosystem Ecology (3 hours)
ECOL 4010L/6010L, Ecosystem Ecology Lab (1 hour)
ECOL(FISH)(WASR) 4310/6310, Freshwater Ecosystems (3 hours)
ECOL(FISH)(WASR) 4310L/6310L, Freshwater Ecosystems Lab (1 hour)
HORT(CRSS) 4430/6430, Plant Physiology (3 hours)
MARS 3450, Marine Biology (3 hours)
MARS 3450L, Marine Biology Laboratory (1 hour)
MARS 4010, Marine Ecology (3 hours)
MARS(PBIO) 4160-4160L, Life and Death in the Salt Marsh (3 hours)
PBIO 3650-3650L, Plant Ecology (4 hours)

Physical Dimensions

CRSS(FANR) 3060, Soils and Hydrology (3 hours)
CRSS(FANR) 3060L, Soils and Hydrology Laboratory (1 hour)
CRSS(GEOL) 4540/6540-4540L/6540L, Pedology (3 hours)
CRSS 4580/6580, Soil Erosion and Conservation (3 hours)
CRSS 4600/6600, Soil Physics (3 hours)
CRSS 4600L/6600L, Soil Physics Laboratory (1 hour)
CRSS 4670/6670, Environmental Soil Chemistry (3 hours)
ENGR 3160, Fluid Mechanics (3 hours)
ENGR(MARS) 4113/6113-4113L/6113L, Introductory Geophysical Fluid Dynamics with Applications (4 hours)
ENVE(MARS) 4175/6175, Coastal Meteorology (3 hours)
ENVE 4410/6410, Open Channel Hydraulics (3 hours)
GEOG 3010, General Geomorphology (3 hours)
GEOG 3290, Mountain Geography (3 hours)
GEOG 4020/6020, Fluvial Geomorphology (3 hours)
GEOG 4040/6040, Global Environmental Change Past and Present (3 hours)
GEOL 4220/6220, Hydrogeology (3 hours)
GEOL 4500/6500-4500L/6500L, Sedimentary Geology (3 hours)
MARS 4100/6100, Geological and Physical Oceanography (3 hours)
MARS 4800/6800, Regional Oceanography of the South Atlantic Bight (3 hours)
WASR(FORS) 4110/6110-4110/6110L, Forest Hydrology (4 hours)

WASR(CRSS)(ECOL)(ENGR)(GEOG)(GEOL) 4700L/6700L, Hydrology, Geology and Soils of Georgia (3 hours)

Practice and Implementation

BCHE(ENVE) 4490/6490, Environmental Engineering Remediation Design (3 hours)

ECOL 4080/6080, Principles of Integrative Conservation and Sustainability (4 hours)

ECOL(FANR) 4220/6220, Restoration Ecology (3 hours)

ECOL(MARS) 4225-4225L, Methods in Marine Ecology (4 hours)

ECOL 4450/6450-4450L/6450L, GIS for Ecologists (3 hours)

ENVE 3320, Environmental Engineering – Urban Systems (3 hours)

ENVE 4250/6250, Energy Systems and the Environment (3 hours)

ENVE 4435/6435, Natural Resource Engineering (3 hours)

GEOG 4060/6060, Field Methods: Environmental Monitoring and Assessment (3 hours)

GEOG 4350/6350-4350L/6350L, Remote Sensing of Environment (3 hours)

GEOG 4570/6570-4570L/6570L, Advanced Geographic Information Science (3 hours)

LAND 4390/6390, Ecological Landscape Restoration (3 hours)

LAND 4730/6730, Issues and Practices in Sustainable Design (3 hours)

MARS 4960S, Faculty-Mentored Undergraduate Service and Outreach in Marine Science (1-3 hours)

WASR 4400/6400-4400L/6400L, Wetland Management and Restoration (3 hours)

WILD 4100-4100L, Principles of Wildlife Habitat and Management (3 hours)

5. Model Program and Accreditation

- a. Identify any model programs, accepted disciplinary standards, and accepted curricular practices against which the proposed program could be judged. Evaluate the extent to which the proposed curriculum is consistent with these external points of reference and provide a rationale for significant inconsistencies and differences that may exist.**

Example model programs include:

- [Ecological Restoration Undergraduate and Graduate Certificate](#), Montana Tech
- [Restoration Ecology Undergraduate Certificate](#), University of Idaho
- [Ecological Restoration Undergraduate Certificate](#), Grand Valley State University

The proposed program includes approximately the same number of required total credit hours (15+), as well as the same range of acceptable courses in the courses of study for these model programs, spanning ecology, conservation biology, natural resources management, and plant biology. Major differences include: a greater number of electives in the proposed certificate, a required engineering course, and a smaller number of required courses. These three differences are all intentional and are meant to: (1) add applied rigor and an engineering perspective to the course of study, and (2) enable a broader portion of the student body to participate in and benefit from the certificate. To the latter point, the cross-disciplinary interaction of students from different academic units is a key objective and advantage of the

proposed program. By contrast, model programs in ecological restoration are focused mainly on biology and natural resources students and may as a result see more limited enrollment.

b. If program accreditation is available, provide an analysis of the ability of the program to satisfy the curricular standards of such specialized accreditation.

No program accreditations currently exist in the broader field of Nature-based Solutions. The Society for Ecological Restoration ([SER](#)) offers a Certified Ecological Restoration Practitioner ([CERP](#)) program for professionals looking to enter this space. This certificate provides foundational knowledge to complement students' major discipline to make them more competitive for jobs in related fields or to enable them to pursue additional studies and obtaining this certification. These achievable accreditation requirements consist of 15 credits in biological science (at least 9 credits in ecology), 15 credits in soils, hydrology, geology, climate science, physics, chemistry, fluvial geomorphology, 12 credits in resource management and conservation, and 9 credits in quantitative science (at least 6 credits in inventory, monitoring, and assessment).

6. Student Learning Outcomes

Describe the proposed learning outcomes for the certificate program.

The following **four student learning outcomes** are principal objectives for the ERNE certificate.

Student Learning Outcome 1: Understand the core concepts and approaches of Ecological Restoration, Restoration Ecology, Nature-based Solutions, Ecological Engineering, and Engineering With Nature, the distinctions between them, or the contributions of those disciplines to ecological restoration and Nature-based Solutions projects.

Student Learning Outcome 2: Integrate concepts, approaches, and vocabulary from ecology, engineering, and ecological restoration for written and oral communication, project management, and decision-making.

Student Learning Outcome 3: Apply interdisciplinary knowledge and innovative skills to key collaborative processes in project management, including planning, testing, data collection, implementation, and monitoring.

Student Learning Outcome 4: Build collaboration and leadership skills to work productively as part of an interdisciplinary project delivery team

Course Learning Outcomes

Learning outcomes for required non-elective courses in the certificate are mapped below onto these four outcomes.

Student Learning Outcome 1: Understand the core concepts and approaches of Ecological Restoration, Restoration Ecology, Nature-based Solutions, Ecological Engineering, and Engineering With Nature, the distinctions between them, or the contributions of those disciplines to ecological restoration and Nature-based Solutions projects.

Course	Course-specific Learning Objectives
ECOL 1000	SLO-2: Students will define and understand basic ecological principles at different levels of complexity, including organisms, populations, communities, and ecosystems, and gain an understanding of the range of ecosystem services provided by the natural world.
ECOL 3300	SLO-1: Describe foundational principles of social-ecological systems, sustainability, and resilience.
ECOL 3500	SLO-1: The student will acquire an understanding of the structure and function of natural systems from the perspective of scientific discipline, an introduction to selected scientists investigating natural systems, and the experimental design and results of their research. SLO-3: The role of humans as a pervasive force within the natural environment will be discussed, particularly the emerging discipline of landscape ecology and global conservation of species.
ECOL 3530	SLO-2: Students will understand how biodiversity is measured and valued, and the principal current threats to biodiversity. SLO-3: Students will understand the practice and complexity of preserving biodiversity through applied case studies.
ECOL 3770S	SLO-1: Students will understand and discuss how built environments and man-made surfaces affects physical, chemical, and biological characteristics of ecosystems.
ECOL 3885S	SLO-3: Students will be able to demonstrate knowledge of diverse approaches to predicting, preventing, and managing invaders of terrestrial and aquatic invasions.
ECOL 4010/6010	SLO-2: Students will identify the ecosystem concepts that underlie current environmental issues.
ECOL 4080/6080	SLO-2: Demonstrate how the science of conservation biology is used to solve management problems using tools such as structured decision making, population viability analysis, conservation genetics, and systematic conservation planning. SLO-4: Explain principles of sustainability, including the need for systems thinking, as well as the potential for and challenges of sustainable manufacturing, sustainable energy, and sustainable resource use.
ECOL(FANR) 4220/6220	SLO-1: Students will learn to understand and analyze ecosystem degradation and restoration from a systems perspective. SLO-2: Students will learn to apply fundamental ecological principles to analyze problems and inform practice in restoration ecology. SLO-3: Students will explore and appreciate the history and plurality of rationales, values, goals, and tradeoffs associated with restoration. SLO-4: Students will learn to identify how both ecological theory and values are translated into planning and action through restoration methods and decision-making.

	SLO-5: Students will gain deeper appreciation of ongoing challenges, tensions, and dilemmas in restoration ecology by studying and evaluating primary literature and case studies.
ECOL(MARS) 4225-4225L	SLO-3: Become acquainted with standard methods in ecology.
ECOL(FISH)(WASR) 4310/6310	SLO-1: To increase student understanding of the ecological structure and function of freshwater systems. We will accomplish this goal by studying the basic physics, chemistry, and biology of lakes, streams, and wetlands, and becoming familiar with many of the techniques used in aquatic ecological research. SLO-2: To increase student understanding of current threats to freshwater ecosystems. We will accomplish this goal by studying the ways in which freshwater ecosystems are potentially degraded using the assigned readings in the text and the peer-reviewed literature.
ENVE 2610	SLO-1: Students will understand the role of environmental engineering in society. SLO-2: Students will understand the interrelationships of energy, natural resources, sustainability, and engineering. SLO-8: Students will frame environmental and sustainability issues within the context of energy, natural resources, economy, and engineering practices.
MARS 4010	SLO-1: Students will quantify primary production and nutrient dynamics (C, N, P, Si) from real datasets and models and defend results with appropriate uncertainty. SLO-3: Students will evaluate competing hypotheses about marine ecosystem function, stability, and resilience and argue for the best-supported explanation. SLO-4: Students will evaluate data and models to quantify or infer the flow of energy and materials between system components. SLO-5: Students will assess human impacts and ethics in marine conservation (e.g., fisheries, restoration, climate adaptation) and propose responsible actions SLO-7: Students will compare structure, function, and resilience across global marine biomes (rocky intertidal, abyssal/deep sea, polar) and synthesize common mechanisms and key differences.
WILD 4100-4100L	SLO-1: Describe the concepts of habitat, habitat use, habitat selection, habitat quality, and critical habitats SLO-2: Describe the functional and structural components and resources of wildlife habitat SLO-3 Apply fundamental ecological, evolutionary, and behavioral concepts to identify wildlife habitat requirements. Evaluate and perform wildlife habitat assessments SLO-4: Identify strategies to manage wildlife habitat to alter the demography of target species SLO-5: Discuss the specific role of plants and the traits of plants related to wildlife habitat and habitat management practices

Student Learning Outcome 2: Integrate concepts, approaches, and vocabulary from ecology, engineering, and ecological restoration for written and oral communication, project management, and decision-making.

Course	Course-specific Learning Objectives
ECOL(ENVE) 3300	<p>SLO-1: Understand and describe important physical, chemical, and biological processes that affect ecosystem structure and function, biodiversity, and natural infrastructure performance.</p> <p>SLO-2: Explain, use, and illustrate mass balances, water balances, energy balances, and chemical balances as tools to help understand and describe ecosystem functions.</p> <p>SLO-4: Apply concepts of ecological theory, including niche theory, metapopulation dynamics, life history, and population viability to understanding the mechanisms and functions behind ecological restoration, engineering, and natural infrastructure projects.</p>
ECOL 4720S	<p>SLO-1: Students will apply knowledge from their major field of study to planning and designing nature-based interventions to solve stakeholder and client problems.</p> <p>SLO-2: Students will work closely with stakeholders, clients, and other community members to understand their needs and characterize problems and solutions relating to ecological restoration and NbS.</p> <p>SLO-4: Students will gain an understanding of the social, cultural, and economic equity aspects of NbS and ecological restoration projects.</p>
WILD(ECOL) 3580	<p>SLO-2: Know the identifying characteristics, specific nomenclature, and natural history of the common vertebrates of the southeastern United States.</p>

Student Learning Outcome 3: Apply interdisciplinary knowledge and innovative skills to key collaborative processes in project management, including planning, testing, data collection, implementation, and monitoring.

Course	Course-specific Learning Objectives
AENG 4911S	<p>SLO-1: Students will understand problem-framing, stakeholder analysis, concept generation, and project management skills.</p> <p>SLO-2: Students will have a major design experience in agricultural engineering prior to graduation.</p>
CVLE 4910S	<p>SLO-1: Students will apply mathematics, science and engineering principles to solve a meaningful civil engineering design problem that involves meeting real-world needs while overcoming practical constraints.</p>
CVLE 4911S	<p>SLO-1: Students will apply mathematics, science and engineering principles to solve a meaningful civil engineering design problem that involves meeting real-world needs while overcoming practical constraints.</p>
ECOL(ENVE) 3330	<p>SLO-5: Understand the planning process for large scale civil works projects that utilize nature-based solutions.</p>

ECOL 4720S	SLO-6: Students will critically assess potential options and solutions and source material (e.g., datasets) for their planning and project deliverables.
ENVE 4910S	SLO-1: Students will understand the engineering design methodology for problem-solving and decision-making in complex issues relevant to environmental engineering. SLO-2: Students will understand the application of specific engineering design standards and constraints relevant to engineering practice.
ENVE 4911S	SLO-1: Students will understand the engineering design methodology for problem-solving and decision-making in complex issues relevant to environmental engineering. SLO-2: Students will understand the application of specific engineering design standards and constraints relevant to engineering practice.

Student Learning Outcome 4: Build collaboration and leadership skills to work productively as part of an interdisciplinary project delivery team

Course	Course-specific Learning Objectives
AENG 4910S	SLO-1: Students will have an opportunity to develop competence and self-confidence as design engineers. SLO-2: Students will develop decision-making and communication skills with the assistance of state-of-the-art design innovation tools. SLO-4: Students will participate in a service-learning project with requirements gathering, planning, and development of a product for an internal/external client.
CVLE 4910S	SLO-3: Students will participate in a service-learning project with requirements gathering, planning, and development of a product for an internal/external client.
CVLE 4911S	SLO-2: Students will understand the necessity of working in multidisciplinary teams and the importance of developing good communication skills.
ECOL(ENVE) 3330	SLO-6: Develop the capacity to serve as a productive and effective member of an interdisciplinary project delivery team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives for a large-scale natural infrastructure project.
ECOL 4720S	SLO-3: Students will learn professional skills for facilitating discussions, writing reports, and sharing deliverables with clients. SLO-5: Students will form and coordinate teams for setting and achieving project goals
ENVE 4910	SLO-3: Students will participate in a service-learning project with requirements gathering, planning, and development of a product for an internal/external client.

7. Assessment

Describe how the learning outcomes for the program will be assessed.

Student learning outcomes will be assessed through the following:

- 1) Students will be required to receive a grade of a “C” (2.0) or better in all required and elective courses counted towards the certificate.
- 2) An exit questionnaire will be issued to graduating certificate students, to collect the following information: student major, certificate courses taken, grades earned, attainment of learning outcomes. The exit questionnaire will be composed by the Certificate Directors, in collaboration with the Certificate Advisory Board and the Center for Teaching and Learning.

8. Faculty Resources

Define the size, experience, and specializations of the full-time faculty needed to support an effective program. Specify how many full-time faculty will provide direct instructional support to this program.

The co-directors of the Certificate in Restoration Ecology and Nature-based Solutions will work in collaboration with the Academic Program Assistants in the Odum School of Ecology and College of Engineering to provide instructional support for the program. The Advisory Board will provide expert suggestions, feedback, and performance review for the program. No new faculty hires will be necessary to support the teaching needs for the program. The Co-Directors will be responsible for teaching or co-teaching the new courses created for the program. All other existing courses have designated instructors.

9. Faculty Members

For each faculty member directly involved in this program, please provide:

- a. Name, rank, degree(s), academic specialty, and educational background**
- b. Special qualifications related to this program**
- c. Relevant professional and scholarly activity for the past five years**
- d. Projected responsibility in this program and required adjustments in current assignments**

Charles B. van Rees, Assistant Professor, Odum School of Ecology. Ph.D.

Dr. van Rees is an interdisciplinary conservation scientist with experience in biodiversity conservation in anthropogenic landscapes. He has worked for several years with the UGA Institute for Resilient Infrastructure Systems (IRIS) developing integrative projects linking biodiversity conservation and ecological restoration to natural infrastructure and nature-based solutions projects. Dr. van Rees will act as one of the co-directors of the proposed certificate program, a co-instructor of the ECOL(ENVE) 3330 foundations course, and the instructor of the ECOL 4720S capstone course. Dr. van Rees' current appointment includes 12% FTE for administration specifically to carry out these tasks.

Allison Injaian, Senior Lecturer, Odum School of Ecology. Ph.D.

Dr. Injaian is an experienced instructor who has taught and administered coursework at the Odum School of Ecology as a lecturer and academic coordinator for five years. Dr. Injaian will assist with maintaining and updating the certificate's program of study; her current assignment includes administrative duties toward these functions.

Brian Bledsoe, Professor, College of Engineering. Ph.D., P.E.

Dr. Bledsoe is the founder of IRIS with decades of experience in ecological and environmental engineering and a leader in the field of natural infrastructure research and development. For the last 5 years he has co-founded and expanded the Network for Engineering With Nature (N-EWN), a collaborative, national network of scientists and engineers working to advance research on natural infrastructure. Dr. Bledsoe will act as a senior advisor to the director and a co-instructor of the ECOL(ENVE) 3330 foundations course.

Advisory Board

The proposed certificate has been developed in consultation with an advisory board of faculty and experts who have committed to providing input and support in changes to the program and yearly operation, as well as performance assessment for the program. Board members will serve 2-year renewable terms on a volunteer basis.

Tasks of the board will include:

- 1) Overseeing the certificate program and its administration
- 2) Revising program requirements if necessary
- 3) Approving new courses

The advisory board currently consists of five members, but more will be added from other academic units and partner organizations when possible.

Board Members:

Dr. Todd Bridges, College of Engineering

Dr. Lizzie King, Warnell School of Forestry and Natural Resources and Odum School of Ecology

Dr. Rhett Jackson, Warnell School of Forestry and Natural Resources

Dr. Amanda Tritinger, U.S. Army Corps of Engineers

Dr. John Calabria, College of Environment and Design

10. Facilities and Resources

- a. **Describe the building, classroom, laboratory, and office space that will be available for this program and evaluate their adequacy to fully support an effective program. Plans for allocating, remodeling, or acquiring additional space to support the program's full implementation should also be identified.**

The new courses that are being developed for this certificate will run in existing classrooms in the Ecology building and/or classroom space that is designated for Ecology courses in Cedar Street Building A.

Given that no new faculty or staff need to be hired to run this certificate, no additional office space is required to effectively support this program.

- b. Describe the available library resources for this program and the degree to which they are adequate to support an effective program. Identify the ways and the extent to which library resources need to be improved to adequately support this program.**

Current resources are adequate to support the certificate.

- c. Document the extent to which there is sufficient computer equipment, instructional equipment, laboratory equipment, research support resources, etc., available to adequately support this program. Specify improvements needed in these support areas.**

The equipment that is currently in the relevant classrooms is adequate to support the certificate.

11. Budget

- a. Detailed funding to initiate the program and subsequent annual additions required to fully implement the program are needed below. Estimates should be based upon funding needed to develop an effective and successful program and not the minimum investment required to mount and sustain a potentially marginal program.**

No additional funding will be necessary to administer the program. Costs associated with creating new courses, advising students, additional workload on staff, administration of the certificate, and working with stakeholders will be minimal and are within existing capacity.

- b. Indicate the extent of student support (fellowships, assistantships, scholarships, etc.) available for this program, and evaluate the adequacy of this support. Assistantships funded from institutional (as opposed to sponsored) funds should be included in this funding analysis as well.**

No assistantships or student support will be provided by the program.

- c. Identify sources of additional funds needed to support the program and the probability of their availability.**

No additional funds will be needed to support the program.

d. Identify long-range plans for additional or expanded facilities necessary to support an effective program. Evaluate the timing and likelihood of such capital funding.

No expanded facilities will be needed to support the program.

12. Administration

Describe and evaluate the structure for the administration of the program. Describe the process and criteria for how students will be admitted to and retained in the program.

The ERNE certificate will be administered by the co-directors in consultation with the Advisory Board, with additional administrative support from staff at the College of Engineering and Odum School of Ecology. The co-directors and support staff will:

- 1) Coordinate course offerings and maintain student records
- 2) Coordinate and promoting related activities (e.g., seminars, speakers, receptions)
- 3) Convene and consult with the advisory board

Students will apply to the certificate at any point in their course of study via an application portal housed on the Odum School of Ecology's website. Any student in good standing at the university will be accepted. Students will be notified via email when they have been accepted into the program. Students will take part in a pre-entry survey, as well as a survey upon completion of the certificate, to document changes in relevant student knowledge.

13. References

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Department of Plant Biology

Franklin College of Arts and Sciences

UNIVERSITY OF GEORGIA

1 September 2025

To Whom It May Concern,

This letter is to signify my support of the proposed certificate program in Restoration Ecology and Nature-based Solutions as Head of the Department of Plant Biology. My staff and I have been in dialogue with Dr.'s van Rees and Injaian to select courses in our unit that would be appropriate for the certificate, and we confirm that the certificate is compatible with the course-of-study of the selected majors in our unit.

We look forward to the establishment of this program on campus.

Sincerely,

John M. Burke, Ph.D.

Distinguished Research Professor & Head
Department of Plant Biology



UNIVERSITY OF
GEORGIA

Franklin College of Arts and Sciences
Department of Marine Sciences

Marine Sciences Building
325 Sanford Dr.
Athens, Georgia 30602
TEL 706-542-2820 | FAX 706-542-5888
daniela@uga.edu
<http://marsci.uga.edu/>

September 25, 2025

To Whom It May Concern,

This letter is to signify my support of the proposed certificate program in Restoration Ecology and Nature-based Solutions as Department Head of Marine Sciences. My staff and I have been in dialogue with Dr.'s van Rees and Injaian to select courses in our unit that would be appropriate for the certificate, and we confirm that the certificate is compatible with the course-of-study of the selected majors in our unit.

We look forward to the establishment of this program on campus.

Sincerely,

Dr. Daniela Di Iorio
Professor and Department Head



Odum School of Ecology
UNIVERSITY OF GEORGIA

To Whom It May Concern,

December 2, 2025

This letter is to signify our support of the proposed undergraduate certificate in Ecological Restoration and Nature-based Engineering (ERNE) as Dean and Associated Dean of Academic Affairs of the Odum School of Ecology. The proposed certificate is compatible with the course-of-study of the AB and BS degrees in Ecology and is in line with our instructional goals as a unit. The ERNE certificate leverages the Odum School's reputation and capacity as a leader in ecosystem ecology and applied ecological research and builds upon growing partnerships between our unit and the College of Engineering. As per the certificate proposal, we confirm the interest and capacity within our unit to host the program in collaboration with partners at Engineering. Dr. van Rees, a member of our faculty and the planned co-director of the certificate from the Odum School, has a designated administration effort allocation in his contract corresponding to responsibilities involved with the certificate. We look forward to launching this certificate and supporting its growth in coming years.

Sincerely,

Dr. Mark D. Hunter
Eugene P. Odum Distinguished Chair in Ecology
Dean, Odum School of Ecology

Dr. Pejman Rohani
Regents' Professor
UGA Athletic Association Professor in Ecology and Infectious Diseases
Associate Dean for Academic Affairs, Odum School of Ecology

Signed: 

Date: 12/2/2025

Signed: 

Date: 12/2/25



**UNIVERSITY OF
GEORGIA**

**Department of
Anthropology**

*Franklin College of
Arts and Sciences*

August 4, 2025

To Whom It May Concern,

This letter is to signify my support of the proposed certificate program in Restoration Ecology and Nature-based Solutions as Department Head of Anthropology. My staff and I have been in dialogue with Dr.'s van Rees and Injaian to select courses in our unit that would be appropriate for the certificate and we confirm that the certificate is compatible with the course-of-study of the selected majors in our unit.

We look forward to the establishment of this program on campus.

Sincerely,

Ted L Gragson
Professor & Unit Head



UNIVERSITY OF
GEORGIA

3111 Miller Plant Sciences
120 Carlton Street
Athens, Georgia 30602
TEL 706-542-2461 | FAX 706-542-0914
www.cropsoil.uga.edu

College of Agricultural and Environmental Sciences
Department of Crop and Soil Sciences

August 7, 2025

To Whom It May Concern,

This letter is to signify my support of the proposed certificate program in Restoration Ecology and Nature-based Solutions as Department Head of Crop and Soil Sciences. My staff and I have been in dialogue with Dr.'s van Rees and Injaian to select courses in our unit that would be appropriate for the certificate and we confirm that the certificate is compatible with the course-of-study of the selected majors in our unit.

We look forward to the establishment of this program on campus.

Sincerely,

Jodi Johnson Maynard
Professor and Department Head
Crop and Soil Sciences



UNIVERSITY OF
GEORGIA

204 Geography/Geology Building
Athens, Georgia 30602
TEL 706-542-2856 | FAX 706-583-2388
www.geography.uga.edu

Franklin College of Arts and Sciences
Department of Geography

To Whom It May Concern,

08/04/2025

This letter is to signify my support of the proposed certificate program in Restoration Ecology and Nature-based Solutions as Department head of Geography. My staff and I have been in dialogue with Dr.'s van Rees and Injaian to select courses in our unit that would be appropriate for the certificate and we confirm that the certificate is compatible with the course-of-study of the selected majors in our unit.

We look forward to the establishment of this program on campus.

Sincerely,

Deepak R. Mishra
Merle C. Prunty, Jr. Professor & Associate Head
Department of Geography
University of Georgia, Athens

Signed:  _____

Date: 08/04/2025



UNIVERSITY OF
GEORGIA

Warnell School of Forestry and Natural Resources

Forestry, Fisheries and Wildlife,
Natural Resources Management and Sustainability,
Parks, Recreation and Tourism Management

Office of the Dean

July 10, 2025

To Whom It May Concern:

This letter is to express my support for the proposed undergraduate certificate program in Restoration Ecology and Nature-based Solutions (RENS) to be offered by the Odum School of Ecology and College of Engineering at UGA. The proposed program will help students from a multitude of majors, including several within the Warnell School of Forestry and Natural Resources, receive the interdisciplinary training necessary to pursue careers in this rapidly growing field.

Dr. 's Injaian and van Rees contacted my staff and I to request permission to include several courses offered within our unit in the electives for the certificate requirements and we granted this permission. We look forward to the approval and development of this program in coming years.

Sincerely,

J. Todd Petty, Dean

Documentation of Approval and Notification

Proposal: Undergraduate Certificate in Ecological Restoration and Nature-Based Engineering

College: Odum School of Ecology; College of Engineering

Department: Odum School of Ecology; College of Engineering

Proposed Effective Term: Fall 2026

School/College:

- Odum School of Ecology Associate Dean, Dr. Pejman Rohani, 10/2/2025
- College of Engineering Assistant Dean, Dr. Mable Fok, 1/13/2026

Use of Course Notifications:

- Interim Head of the Department of Environmental Health Science, Dr. Travis Glenn, 2/3/2026
- College of Environment and Design Dean, Dr. Sonia Hirt, 2/3/2026
- College of Agricultural and Environmental Sciences Associate Dean, Dr. Dean Kopsell, 2/3/2026
- College of Public Health Associate Dean, Dr. Erin Lipp, 2/3/2026
- Head of the Department of Horticulture, Dr. Leonardo Lombardini, 2/3/2026
- Head of the Department of Geology, Dr. Adam Milewski, 2/3/2026
- College of Environment and Design Associate Dean, Professor Ashley Steffens, 2/3/2026

Letters of Support:

- Head of the Department of Plant Biology, Dr. John Burke, 9/1/2025
- Head of the Department of Marine Sciences, Dr. Daniela Di Iorio, 9/25/2025
- Head of the Department of Anthropology, Dr. Ted Gragson, 8/4/2025
- Odum School of Ecology Dean, Dr. Mark Hunter, 12/2/2025
- Head of the Department of Crop and Soil Sciences, Dr. Jodi Johnson Maynard, 8/7/2025
- Associate Head of the Department of Geography, Dr. Deepak Mishra, 8/4/2025
- Warnell School of Forestry and Natural Resources Dean, Dr. J. Todd Petty, 7/10/2025
- Odum School of Ecology Associate Dean, Dr. Pejman Rohani, 12/2/2025